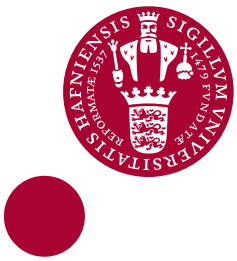

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Notes on *Anolis omiltemanus* Davis, 1954 (Reptilia: Squamata: Dactyloidae)

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Abstract. During a short visit to the region of Omiltemi (Guerrero, Mexico), we observed *Anolis omiltemanus* in its natural habitat and collected 10 specimens. We provide a description of the external morphology of this species based on the newly collected specimens and 30 additional specimens from various museum collections. Also, we include color descriptions in life, color photographs in life, description and illustration of hemipenis morphology, and some natural history notes. *Anolis omiltemanus* seems to be a strictly arboreal species with a strong affinity to pine trees. Finally, we discuss the conservation status of this species.

Keywords. lizard, Dactyloidae, description, hemipenis morphology, Mexico, taxonomy.

Introduction

In 1954, Davis described *Anolis omiltemanus* from "two miles west of Omiltemi, 7800 ft., Guerrero" (holotype TCWC 10278). Since its original description, little has been published on this species. Davis and Dixon (1961) and Flores-Villela and Muñoz-Alonso (1990, 1993) summarized what little we know on the geographic distribution, natural history, and conservation status of this species, which is endemic to the highlands of the Sierra Madre del Sur in central Guerrero, Mexico. According to Flores-Villela and Muñoz-Alonso (1990:1), this species can be found on the ground in leaf litter and in low shrubs of pine-oak and oak forests. In November 2013, three of us (GK, RGTP, and MGP) had the opportunity to visit the region of Omiltemi to search for the three species of anoles known to occur there (i.e., *A. liogaster* Boulenger, 1905, *A. microlepidotus* Davis, 1954, and *A. omiltemanus* Davis, 1954). The goal of this contribution is to summarize the available data on distribution, ecology, and conservation status of *A. omiltemanus* and to provide a detailed description of its external and hemipenis morphology as well as its coloration in life.

Materials and Methods

Recently, Nicholson et al. (2012) proposed a new classification for the anoles, seriously questioned by several researchers (Castañeda and de Queiroz, 2013; Poe, 2013). We choose to be conservative until this debate has been settled and use the name *Anolis* in this article. The collected specimens have been deposited either in the collection of the Senckenberg Forschungsinstitut Frankfurt (SMF) or in the herpetological collection of the Instituto de Biología (IBH), Universidad Nacional Autónoma de México, México D.F., Mexico. A list of the specimens examined is provided in Appendix I. Abbreviations for museum collections follow Sabaj Pérez (2010). The capitalized colors and color codes (the latter in parentheses) are those of Köhler (2012). Terminology of markings used in color descriptions follow Köhler (2012). Coordinates and elevation were recorded using Garmin GPS receivers with built-in

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altimeters. All coordinates are in decimal degrees, WGS 1984 datum, and rounded to the fifth decimal place. Temperature in the natural habitat of *A. omiltemanus* was recorded with automatic data loggers (HOBO Pendant® Temperature Data Logger 8K) placed about 100 cm above the ground about 1.8 km east of the village of Omiltemi (17.55686°N; 99.67200°W; 2080 masl) and set to a recording interval of 10 min. At this site, *A. omiltemanus* is known to occur (Flores-Villela and Muñoz-Alonso, 1990), although we failed to find them there. Head length was measured from the tip of the snout to the anterior margin of the ear opening, with the calipers held in a vertical position relative to the head. Snout length was measured from the tip of the snout to the anterior border of the orbit, with the calipers held in a horizontal position relative to the head. Head width was determined with the broad tips of the calipers aligned with the levels of posterior margin of eye and supralabial scales, respectively, with the calipers held in a vertical position relative to the head. Dorsal and ventral scales were counted at midbody along the midline. Tail height and width were measured at the point reached by the heel of the extended hind leg. Subdigital lamellae were counted on Phalanges II to IV of Toe IV of the hind limbs, and separately on distal phalanx. We considered the scale directly anterior to the circumnasal to be a prenasal. Abbreviations used are AGD (axilla-groin distance), HDT (horizontal diameter of tail), HL (head length), HW (head width), IFL (infralabial scales), IP (interparietal plate), ShL (shank length), SL (snout length), SO (subocular scales), SPL (supralabial scales), SS (supraorbital semicircles), SVL (snout–vent length), TL (tail length), and VDT (vertical diameter of tail). In reporting the frequencies of character states, we used the following terminology: if a character state was present in more than 65% of the examined specimens, we coded it as "usually"; <65% but >20% "commonly"; <20% but >5% "occasionally"; and <5% "exceptionally". To measure dewlap area, we took photographs of males in life with their dewlaps artificially extended using small forceps. The head portion was magnified and printed and then superimposed on millimetric paper; the total number of millimeter squares contained in the extended dewlap was counted. A straight line was drawn between the anterior and posterior insertions of the dewlap. The HL on the printout was also determined. We used the following equation to convert the magnified dewlap area to the real size: $X = [(\sqrt{Y}/A)B]^2$, where X is the real area of the dewlap in square millimeters, Y is the total area (square millimeters) of the dewlap at a magnified scale, A is the HL measure (millimeters) of the anole at a magnified scale, and B is the HL measure (millimeters) of the anole at the real size.

Results and Discussion

In the vicinity of the village of Omiltemi (17.55596°N; 99.68705°W; 2060 m), we found only *Anolis liogaster* but no *A. omiltemanus*. However, we found the latter species to be locally abundant at a pine forest site (17.55262°N; 99.62062°W; 1920 m) about 7 airline km E Omiltemi. Locals told us that this place is known as "La Laguna". Within about one hour search, we collected ten individuals of *A. omiltemanus* (Fig. 1), two adult males, two adult females, and six juveniles (23.5–32.0 mm SVL). To obtain more realistic statistical data on the variation in external morphology of *A. omiltemanus*, we also examined 30 additional specimens of this species from various museum collections (see Appendix I).

Diagnosis. In the field, *Anolis omiltemanus* can be readily differentiated from *A. liogaster* by the different dewlap coloration: Males of *A. omiltemanus* have a yellowish orange dewlap (Fig. 2a,b), whereas those of *A. liogaster* have a pink dewlap. Females of *A. omiltemanus* have a very small dirty white dewlap (Fig. 2c,d), whereas those of *A. liogaster* have a very small to small pink dewlap. In preserved specimens, the most useful characters to separate the two species are (1) hind limb length (fourth toe of adpressed hind limb reaching to level of tympanum or to a point between shoulder and tympanum in *A. omiltemanus* versus usually to a point between posterior and anterior margin of eye or occasionally to a point between tympanum and eye in *A. liogaster*; ratio ShL/SVL 0.18–0.23 in *A. omiltemanus* versus 0.24–0.30 in *A. liogaster*); (2) number of enlarged sublabial scales in contact with infralabial scales (usually two, occasionally one or three, in *A. omiltemanus* versus usually one, exceptionally zero or two, in *A. liogaster*); (3) number of loreal scale rows (usually four, occasionally five, exceptionally three, in *A. omiltemanus* versus commonly four or five, occasionally six, in *A. liogaster*); and (4) number of scales between interparietal and supraorbital semicircles (usually one, commonly two, exceptionally zero, in *A. omiltemanus* versus usually two, commonly one, occasionally three, in *A. liogaster*). *Anolis omiltemanus* differs from the remaining Pacific versant anoles with smooth ventral scales as follows: *Anolis macrinii* Smith, 1968 is a much larger species, with adults > 80 m SVL (versus <50 mm in *A. omiltemanus*) and having the

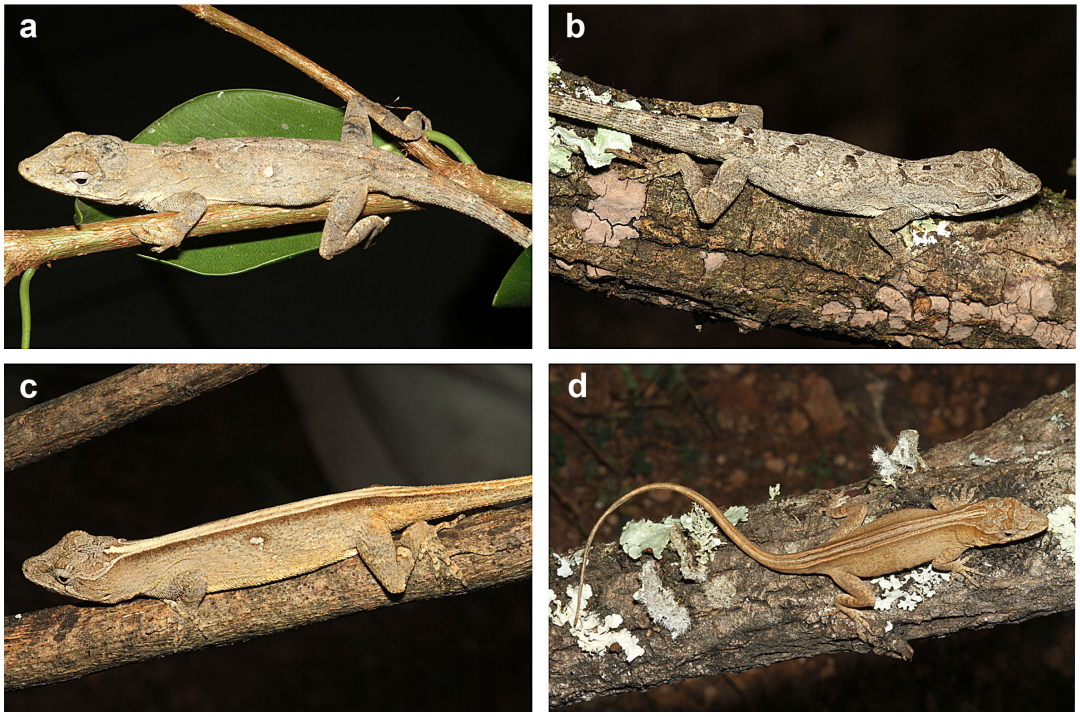

Figure 1. *Anolis omiltemanus* in life. (a) adult male (SMF 96226; SVL 42.5 mm); (b) adult male (SMF 96228; SVL 42.0 mm); (c) adult female (SMF 96229; SVL 48.0 mm); (d) adult female (SMF 96227; SVL 46.5 mm).

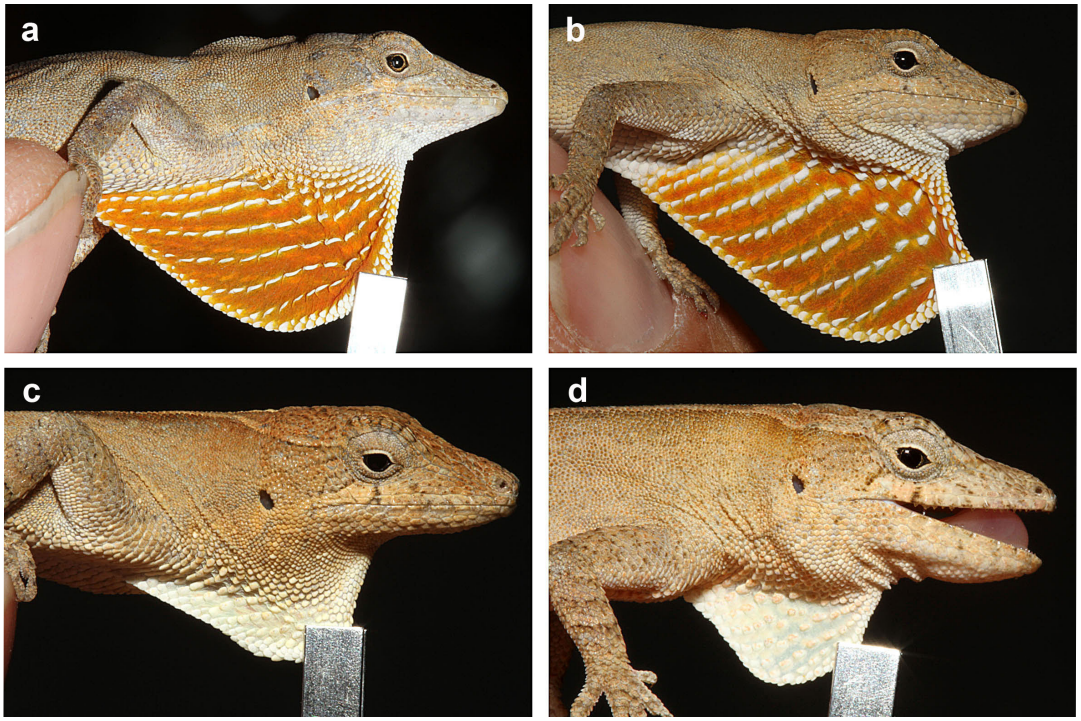

Figure 2. *Anolis omiltemanus* with extended dewlap in life. (a) adult male (SMF 96226); (b) adult male (SMF 96228); (c) adult female (SMF 96229); (d) adult female (SMF 96227).

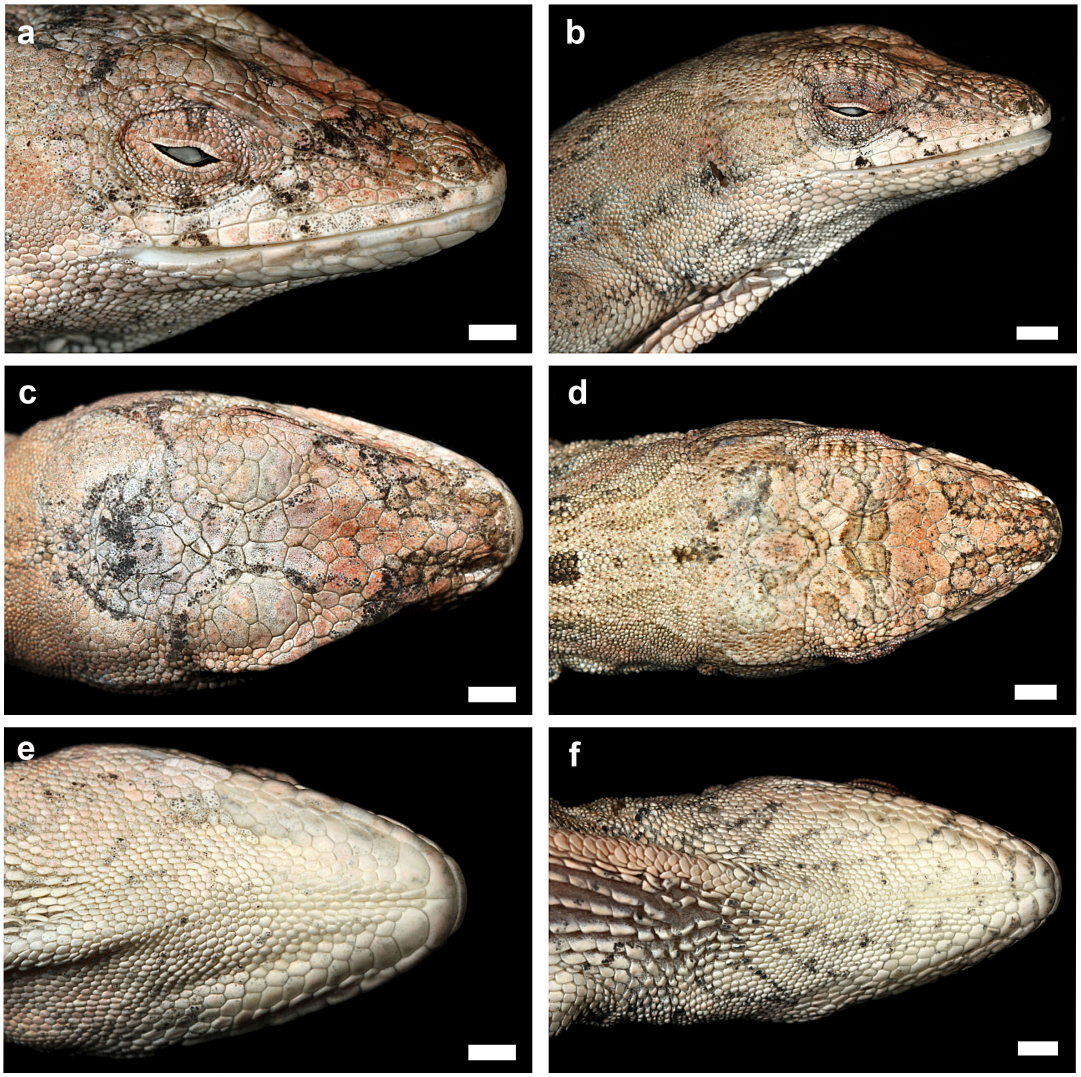

Figure 3. *Anolis omiltemanus*: head scalation in (a,c,e) SMF 96226; (b,d,f) SMF 96228. Scale bars equal 1 mm.

supraoculars in 2–3 rows (versus a patch of 3–4 greatly enlarged scales in a single row in *A. omiltemanus*). *Anolis dunni* Smith, 1936, *A. gadovii* Boulenger, 1905, and *A. taylori* Smith & Spieler, 1945, have 0–6 enlarged dorsal scale rows (versus 10–15 enlarged dorsal scale rows in *A. omiltemanus*) and longer hind limbs with the fourth toe of adpressed hind limb reaching usually to a point between posterior and anterior margin of eye or occasionally to a point between tympanum and eye (versus to level of tympanum or to a point between shoulder and tympanum in *A. omiltemanus*). *Anolis omiltemanus* differs from *A. microlepidotus* that also occurs in the region of Omiltemi by having smooth ventral scales (versus keeled in *A. microlepidotus*), and a uniform yellowish orange dewlap in males (versus male dewlap reddish orange with yellow spots and blotches in *A. microlepidotus*).

It should be noted that Flores-Villela and Muñoz-Alonso (1990:1) stated that *A. omiltemanus* has "two gular scales in contact with the mental" and we are uncertain as to how to interpret this statement since in this species the postmentals vary from three to six (usually four).

Description. Anolis omiltemanus is a small anole (maximum recorded SVL 47.0 mm in males, 48.0 mm

in females); dorsal head scales (Fig. 3) in internasal region rugose or keeled, other dorsal head scales smooth or rugose; moderately deep prefrontal depression present, shallow parietal depression; 4–6 postrostrals; anterior nasal usually single, occasionally divided, the lower scale in contact with rostral and first supralabial or, exceptionally, only with rostral scale (Fig. 4a,b); usually 6, commonly 7, exceptionally 4, internasals; canthal ridge sharply defined; scales comprising supraorbital semicircles well defined, posterior ones smooth, anterior ones weakly keeled, largest scale in semicircles subequal or larger than largest supraocular scale; supraorbital semicircles usually broadly in contact; 0–2 scales separating supraorbital semicircles and interparietal at narrowest point; interparietal well defined, greatly enlarged relative to adjacent scales, surrounded by scales of moderate size, longer than wide, usually about the same size as ear opening; usually 3–4 greatly enlarged supraoculars arranged in a single row; enlarged supraoculars separated from supraorbital semicircles by a complete row of small scales, or these scales narrowly in contact; 1–2 rows of granular scales between enlarged supraoculars and superciliaries; 2–3 elongate superciliaries, anterior one longest, followed posteriorly by a series of 4–5 rounded or squarish scales of moderate size (Fig. 4c,d); 3–4 enlarged canthals; 4–7 scales between second canthals; 5–9 scales present between posterior canthals; loreal region slightly concave, 14–25 mostly keeled (some smooth or rugose) loreal scales in a maximum of 3–5 (usually 4) horizontal rows; 6–8 supralabials to level below center of eye; suboculars keeled, in broad contact with supralabials (2–5 suboculars in contact with 2–5 supralabials); ear opening vertically oval, oriented slightly obliquely; scales anterior to ear opening granulars, twice as large than those posterior to ear opening; 5–9 infralabials to level below center of eye; 3–6 postmentals (usually 4), outer pair at least four times larger than adjacent median postmental scales (Fig. 5); usually two, occasionally one or three, enlarged sublabials in contact with infralabials on each side; faintly keeled granular scales present on chin and throat; male dewlap moderate-sized (150 and 139 mm^2, respectively, in two adult males, SMF 96226, 96228) extending onto chest; 6–7 horizontal gorgetal-sternal rows with 8–16 scales per row; modal number of marginal pairs 2–4; female dewlap very small (28 and 41 mm^2, respectively, in two adult females, SMF 96227, 96229); a nuchal crest and a dorsal ridge present in males; 10–15 middorsal scale rows slightly to moderately enlarged, two vertebral rows occasionally larger than adjacent rows (e.g., in MCZ R-78717) and usually a few smaller scales interspersed in enlarged rows (Fig. 6a,b); weakly to moderately keeled dorsal scales lateral to middorsal series gradually larger than granular lateral scales; usually a few enlarged scales scattered among granular laterals, or lateral scales more or less homogeneous (Fig. 6c,d); 43–62 dorsal scales along vertebral midline between levels of axilla and groin in males, 47–67 in females; 28–40 dorsal scales along vertebral midline contained in one head length in males, 26–42 in females; ventral scales on midsection about twice the size of largest dorsal scales; scales on midventer smooth, subimbricate to imbricate with rounded posterior margins, usually somewhat heterogeneous in size (Fig. 6e,f); 32–50 ventral scales along midventral line between levels of axilla and groin in males, 39–52 in females; 21–38 ventral scales contained in one head length in males, 20–30 in females; 94–124 scales around midbody in males, 94–114 in females; tube-like axillary pocket absent; precloacal scales smooth or weakly keeled; males with two greatly enlarged postcloacal scales (Fig. 7); tail moderately compressed in cross section, tail height/tail width 1.05–1.50 in males, 1.00–1.50 in females; basal subcaudal scales smooth or weakly keeled; lateral caudal scales keeled, homogeneous, although an indistinct division in segments is discernible; dorsal medial caudal scale row slightly enlarged, keeled, not forming a crest; scales on anterodorsal surface of brachium and on dorsal surface of antebrachium weakly to strongly keeled, unicarinate; 21–26 subdigital lamellae on Phalanges II–IV of Toe IV of hind limbs; 5–7 subdigital lamellae on distal phalanx of Toe IV of hind limbs; digital pads dilated, about three times the width of distal phalanx; in the 10 newly collected specimens, the longest toe of the adpressed hind leg reaches to level of tympanum or to a point between shoulder and tympanum. For variation in selected scalation and morphometric characters see Table 1.

The completely everted hemipenis of SMF 96226 (Fig. 8) is a small, slightly bilobed organ; sulcus spermaticus bordered by weakly developed sulcal lips, opening into a large concave area at base of apex; a finger-like processus bordered below by a weak ridge on asulcate side; asulcate side of apex grossly calyculate; apex with transverse folds.

The coloration in life of an adult male (SMF 96228; Fig. 1b) was recorded as follows: Dorsal ground color Mikado Brown (42) grading into Ground Cinnamon (270) and with Dark Brownish Olive (127) paravertebral

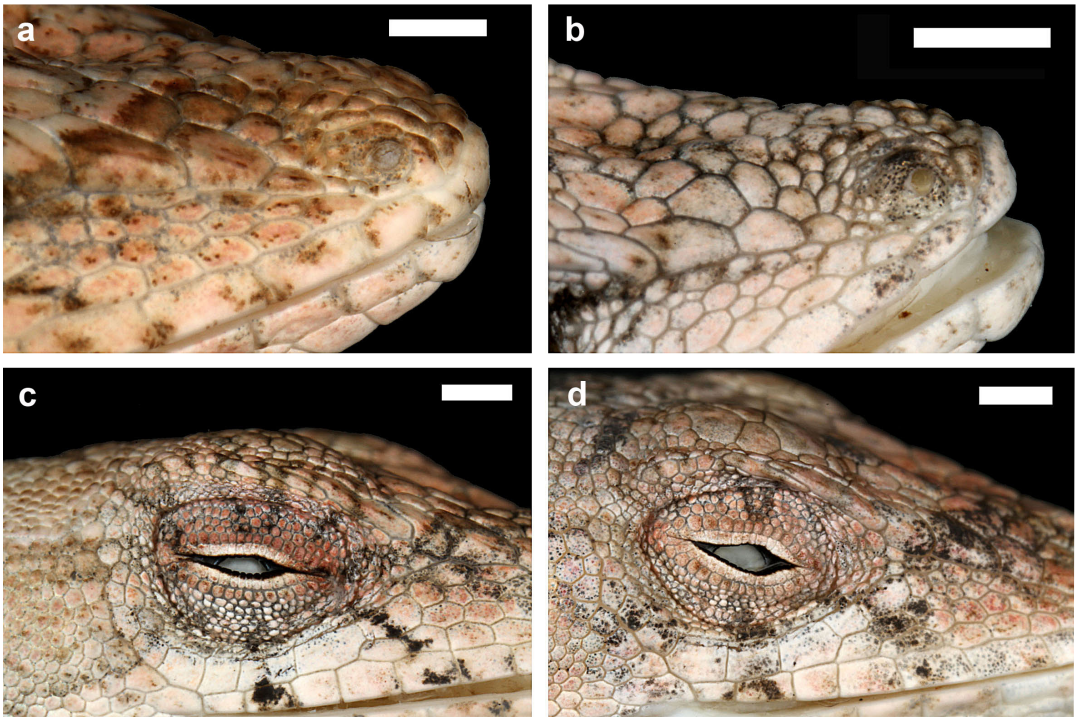

Figure 4. *Anolis omiltemanus*: nasal scalation in (a) SMF 96227; (b) SMF 96230; superciliary scalation in (c) SMF 96228; (d) SMF 96226. Scale bars equal 1 mm.

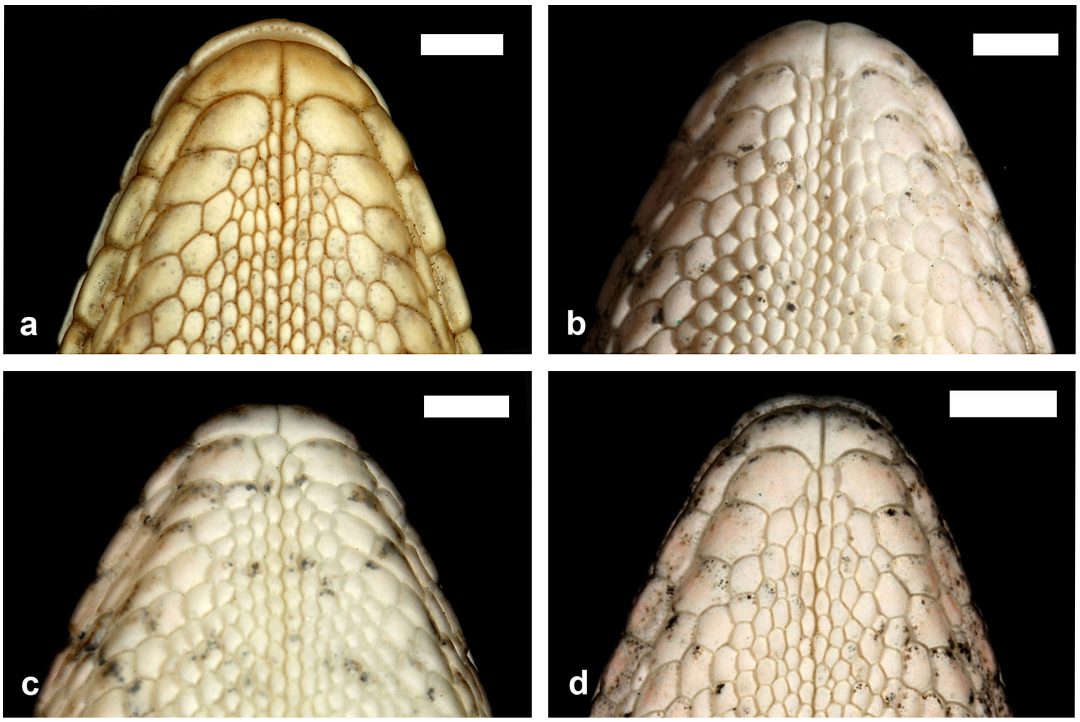

Figure 5. *Anolis omiltemanus*: chin scalation in (a) MCZ R-78717; (b) SMF 96209; (c) SMF 96228; (d) IBH 26559. Scale bars equal 1 mm.

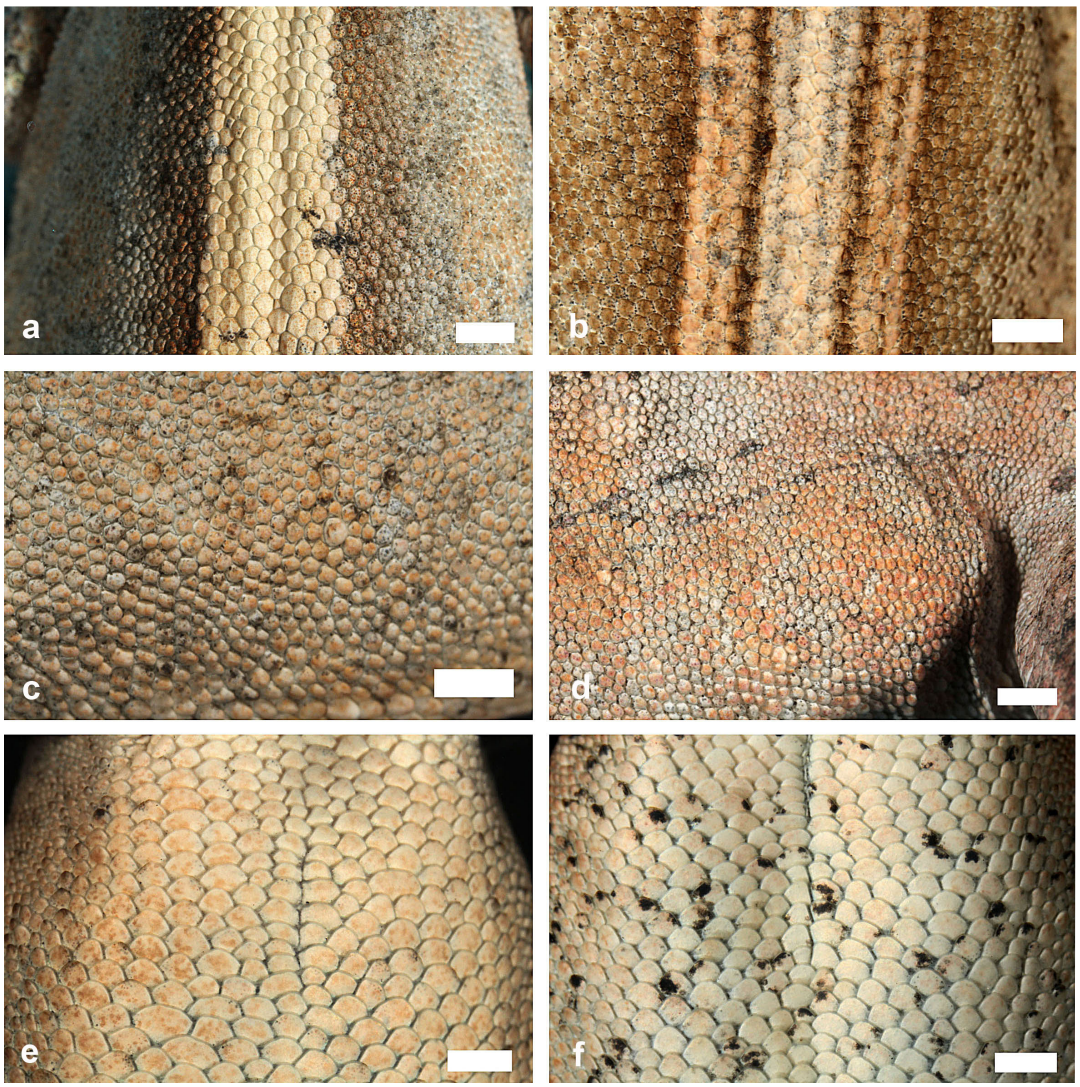

Figure 6. *Anolis omiltemanus*: dorsal scalation in (a) SMF 96229; (b) SMF 96227; flank scalation in (c) SMF 96229; (d) SMF 96226; ventral scalation in (e) SMF 96227; (f) SMF 96228. Scale bars equal 1 mm.

blotches, edged with Cream White (52); a Drab (19) interorbital bar; iris Warm Sepia (40); dewlap Chrome Orange (74) grading into Light Chrome Orange (76) near gorgetal rows; ventral surface of head Pale Buff (1) with Dark Grayish Olive (275) stipples; ventral surfaces of body, limbs and tail Light Buff (2) with Drab (19) suffusions.

The coloration in life of an adult female (SMF 96227; Fig. 1e) was recorded as follows: Dorsal ground color Antique Brown (24) grading into Clay Color (18) on flanks, and with Drab (19) vertebral stripe bordered by a pair of Warm Sepia (40) lines, which are bordered by Pale Pinkish Buff (3) paravertebral stripes; interorbital bar Clay Color (18); iris Warm Sepia (40); dewlap Pale Buff (1); ventral surface of head Light Buff (2) with Light Orange Yellow (7) suffusions; ventral surfaces of body, limbs, and tail Light Buff (2) with Light Flesh Color (250) suffusions.

Natural History Notes. The habitat of *Anolis omiltemanus* at La Laguna is mostly pine forest with some scattered oak trees and with very little undergrowth (Figs. 9a,b). The pine trees are somewhat spaced allowing sunlight to reach the forest floor. We collected all ten specimens of *A. omiltemanus* at night while they were sleeping on the periphery of pine tree branches, 200–500 cm

Table 1. Selected measurements, proportions and scale characters of *Anolis omiltemanus.* Range is followed by mean value and standard deviation in parentheses. For abbreviations see text.

		Anolis omiltemanus ♂ 21 ♀ 19
maximum SVL	males	47.0
	females	48.0
TL / SVL	males	1.58–1.91 (1.67±0.09)
	females	1.46–1.71 (1.57±0.07)
VDT / HDT	males	1.05–1.50 (1.35±0.15)
	females	1.00–1.50 (1.18±0.17)
AGD / SVL	males	0.37–0.48 (0.42±0.03)
	females	0.39–0.48 (0.44±0.03)
HL / SVL	males	0.26–0.31 (0.28±0.01)
	females	0.22–0.31 (0.27±0.02)
HL / HW	males	1.56–1.79 (1.64±0.06)
	females	1.55–1.70 (1.61±0.06)
SL / SVL	males	0.13–0.14 (0.14±0.01)
	females	0.12–0.15 (0.13±0.01)
SL / HL	males	0.44–0.49 (0.47±0.02)
	females	0.43–0.51 (0.47±0.03)
ShL / SVL	males	0.19–0.23 (0.21±0.01)
	females	0.18–0.23 (0.21±0.01)
ShL / HL	males	0.69–0.82 (0.77±0.04)
	females	0.70–0.95 (0.79±0.06)
subdigital lamellae on Phalanges II–IV of Toe IV		21–26 (23.0±1.4)
subdigital lamellae on distal phalanx of Toe IV		5–7 (5.9±0.7)
number of scales between SS		0
number of scales between IP and SS		0–2 (1.2±0.5)
number of scales between SO and SPL		0
number of SPL to level below center of eye		6–8 (6.5±0.6)
number of IFL to level below center of eye		5–9 (6.5±0.8)
total number of loreals		14–25 (19.1±2.7)
number of horizontal loreal scale rows		3–5 (4.1±0.3)
number of postrostrals		4–6 (5.3±0.6)
number of postmentals		3–6 (4.1±0.5)
number of sublabials		1–3 (2.1±0.4)
number of scales between nasals		4–7 (6.2±0.6)
number of moderately to greatly enlarged supraoculars		3–7 (3.9±1.0)
number of scales between 2nd canthals		4–7 (5.5±0.7)
number of scales between posterior canthals		5–9 (7.4±0.9)
number of medial dorsal scales in one head length		26–42 (33.5±4.0)
number of ventral scales in one head length		20–38 (26.6±4.3)
number of medial dorsal scales between levels of axilla and groin		43–67 (55.6±6.4)
number of ventral scales between levels of axilla and groin		32–52 (42.2±5.2)
number of scales around midbody		94–124 (106.6±7.0)

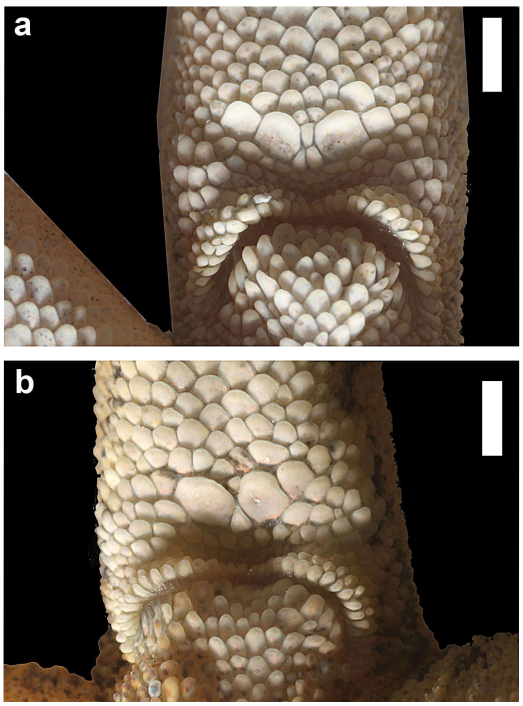

Figure 7. *Anolis omiltemanus*: cloacal region in (a) SMF 96226; (b) SMF 96228. Scale bars equal 1 mm.

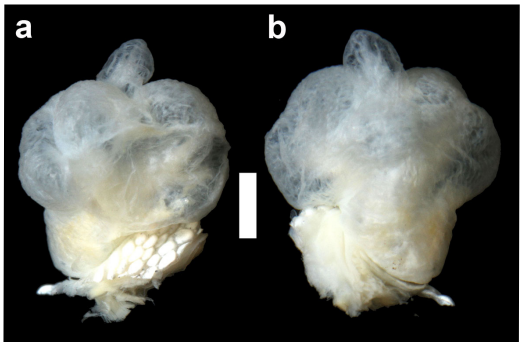

Figure 8. *Anolis omiltemanus*: everted hemipenis of SMF 96226; (a) sulcate view; (b) asulcate view. Scale bar equals 1 mm.

above the ground (Fig. 10). During a short visit in the afternoon a few days later, we did not observe any anoles at this site. Obviously, the anoles escaped observation either by perching too high on the trees or by moving to the side of the branch opposite to the position of us when approached by us. This species was said to be "found on the ground in leaf litter and in low shrubs of pine-oak and oak forests" (Flores-Villela and Muñoz-Alonso, 1990:1). A similar statement is found in Flores-Villela and Muñoz-Alonso (1993:431): "It lives mainly between 2,150 to 2,350 meters in the understory vegetation of oak forests, although some specimens were collected in pine-oak forest" (our translation). At least at La Laguna, *A. omiltemanus* seems to be a strictly arboreal species with a strong affinity to pine trees. Placed on the ground, these anoles move in an awkward, clumsy manner. Its extremely short legs are reminiscent of anoles from the *A. pentaprion* group, which are exclusively arboreal species (Köhler, 2010). It is very likely that *A. omiltemanus* is an arboreal pine forest specialist that prefers open pine forests with little undergrowth. This might explain why this species is rare or rarely recorded in the dense pine-oak forests in the vicinity of the village of Omiltemi (Figs. 9c,d) (Flores-Villela and Muñoz-Alonso, 1993). Among our ten individuals collected were six juveniles (SVL < 33 mm), indicating that hatching events had taken place recently.

Our datalogger readings of about three complete days (19–21 November 2012) at a site about 1.8 km east of the village of Omiltemi showed a minimum temperature of 4.5–6.6°C between 02:00h and 09:20h. The highest temperatures were recorded in the time period between 11:00h and 15:00h with values of 13.3–16.1°C. Our collecting site at La Laguna is lower (1920 masl) than the previous records for this species (2000–2400 masl; Flores-Villela and Muñoz-Alonso, 1990).

Conservation status. On the IUCN Red List of Threatened Species, *Anolis omiltemanus* is listed as Least Concern and the population trend is given as stable (IUCN 2012). On the national level, *A. omiltemanus* is in the catagory "special protection" (Pr) by NOM-059-SEMARNAT-2008, the lowest category (Diario Oficial de la Federación, 2010). On the other hand, this species is given a Conservation Status Score of 4 by Wilson and Townsend (2010), which is one point above the highest score in the very high conservation concern category. More field work is needed in order to get a better understanding of the population size and the actual geographic distribution of this species.

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Figure 9. Habitat of *Anolis* ***omiltemanus***: (a,b) near La Laguna, Guerrero, Mexico; (c,d) near Omiltemi, Guerrero, Mexico.

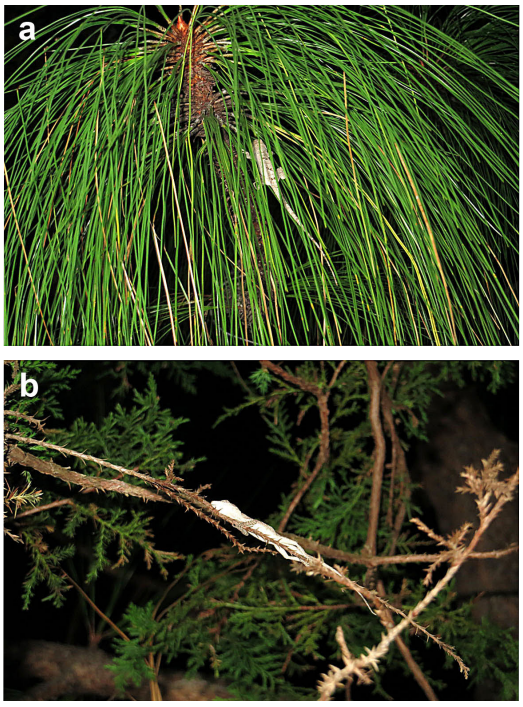

Figure 10. Individuals of *Anolis omiltemanus* sleeping on branches near La Laguna, Guerrero, Mexico.

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References

Boulenger, G.A. (1905): Descriptions of new reptiles discovered in Mexico by Dr. H. Gadow, F.R.S. Proceedings of the Zoological Society of London **1905**: 245–247.

Castañeda, M.d.R., de Queiroz, K. (2013): Phylogeny of the

Dactyloa clade of *Anolis* lizards: New insights from combining morphological and molecular data. Bulletin of the Museum of Comparative Zoology **160**: 345–398.

Davis, W.B. (1954): Three new anoles from Mexico. Herpetologica **10**: 1–6.

Davis, W.B., Dixon, J. R. (1961): Reptiles (exclusive of snakes) from the Chilpancingo region, Mexico. Proceedings of the Biological Society of Washington **74**: 37–56.

Diario Oficial de la Federación (2010): NOM-059-SEMARNAT-2010. SEMARNAT, Mexico D.F.

Flores-Villela, O., Muñoz-Alonso, A. (1990): *Anolis omiltemanus* Davis. Catalogue of American Amphibians and Reptiles **490**: 1–2.

Flores-Villela, O., Muñoz-Alonso, A. (1993): 13. Anfibios y reptiles. In: Historia natural del Parque Ecológico Estatal Omiltemi, Chilpancingo, Guerrero, Mexico, p. 411–442. Luna, I. & J. Llorente, Eds., Mexico D.F., CONABIO-UNAM Ediciones Tecnico Científicas.

IUCN (2012): IUCN Red List of Threatened Species. Version 2012.2. Available at: http://www.iucnredlist.org. Last accessed on 11 January 2013.

Köhler, G. (2010): A revision of the Central American species related to *Anolis pentaprion* with the resurrection of *A. beckeri* and the description of a new species (Squamata: Polychrotidae). Zootaxa **2354**: 1–18.

Köhler, G. (2012): Color catalogue for field biologists. Offenbach, Herpeton-Verlag.

Nicholson, K.E., Crother, B.I., Guyer, C., Savage, J.M. (2012): It is time for a new classification of anoles (Squamata: Dactyloidae). Zootaxa **3477**: 1–108.

Poe, S. (2013): 1986 Redux: New genera of anoles (Squamata: Dactyloidae) are unwarranted. Zootaxa **3626**: 295–299.

Sabaj Pérez, M.H. (2010): Standard symbolic codes for institutional resource collections in herpetology and ichthyology. An online reference. Version 1.5 (4 Oct 2010). Available from http://www.asih.org/ (accessed 07 June 2013).

Smith, H.M. (1936): A new *Anolis* from Mexico. Copeia **1936**: 9.

Smith, H.M. (1968): Two new lizards, one new, of the genus *Anolis* from Mexico. Journal of Herpetology **2**:143–146.

Smith, H.M., Spieler, R.A. (1945): A new anole from Mexico. Copeia **1945**: 165–168.

Wilson, L.D., Townsend, J.H. (2010): The herpetofauna of Mesoamerica: biodiversity significance, conservation status, and future challanges. In: Conservation of Mesoamerican Amphibians and reptiles, p. 761–812. Wilson, L.D., Townsend, J.H., Johnson, J.D., Eds., Eagle Mountain, Utah, USA, Eagle Mountain Publishing.

Appendix I. Specimens examined

Anolis dunni—**Mexico:** Guerrero: Acahuizotla: KU 87309, MCZ R-78696–98, USNM 47753; Agua de Obispo: FMNH 116751, IBH 26591–92, KU 87306–08, MCZ R-78722–23, SMF 96194, 96371–72, 96379–81; near Agua de Obispo, Km 350–351: UIMNH 20125; Chilpancingo: SMF 96238–39; Malpais, S of Chilpancingo: UIMNH 20126; Petaquillas near Chilpancingo: IBH 26589–90, SMF 96252–54; 1 mi SW Colotlipa: MCZ R-78719–21; Presa El Molino near Tixtla: IBH 26611, 26594, SMF 96255–56; 7.1 mi S Puerto Gallo: UMMZ 130983; 19.2 mi S Puerto Gallo: UMMZ 130984; 8.6 mi (by road) N from San Vicente: UTA R-4178.

Anolis gadovii—**Mexico:** Guerrero: near Palo Gordo: IBH 26585, 26610, SMF 96195–96; Tierra Colorada: FMNH 106101, 106106, 114445, 114448, 114450–57, MCZ R-39707, R-93669, UIMNH 20107-10, 20129-30, 57204-06, 57209, 57212, 57214, 57216, 57219, 57224-26, 57228, 57230-31, UMMZ 81953.

Anolis liogaster—**Mexico:** Guerrero: 17.2 mi W Asoleadero: UMMZ 130982; Pueblo los Morros, 62.8 km from Zumpango del Rio via Casa Verde: UMMZ 229861–62, 229864, 229866–67; Pueblo Los Morros: UMMZ 229870; W of Chilpanzingo, between the villages Filo de Caballo y Carrizal: UMMZ 229869; 37.7 km SW Filo de Caballo: KU 182540–42; 14.1–14.4 km SW Puerto de Gallo: KU 182543; Omiltemi: BMNH 1946.8.8.53–54, FMNH 108508, 125620–21, 125624, IBH 26599–601, 26605–06, MCZ R-85021–22, SMF 96199–206, USNM 47748–51, 148865; 0.5–1.0 mi S Omiltemi: UTA R-4409; 1.4 mi W Patio de Aviacion: UMMZ 130981.

Anolis macrinii—**Mexico:** Oaxaca: Cafetal Santa Hedvigis near Pochutla: MCZ R-46202, UIMNH 78762; Carretera Pochutla-San José Pacífico: ENS 12012, 12022 (MZFC uncatalogued); Copalita: SMF 96209; Desviación a molino de piedra Juquilita: MZFC 22631; Pluma Hidalgo: MZFC 16565; near Pluma Hidalgo: SMF 96387; Río Eureka, Pluma Hidalgo: MZFC 22636; Santiago la Galera: IBH 26577, IBH 26580, 26583, SMF 96207, 96210; Sierra Madre del Sur, Santiago La Galera: MZFC 16425; Taquería Santiaguita: SMF 96208; near Tierra Blanca: SMF 96388; Carretera Pochutla-Oaxaca: UTA R-52813; 41.4 km S of San Miguel Suchixtepec [by Mexico Hwy. 175]: MVZ 165249.

Anolis microlepidotus—**Mexico:** Guerrero: Amojileca: SMF 96213; Chilpancingo: MCZ R-33696–97; Petaquillas near Chilpancingo: IBH 26572–73, SMF 96214; Omiltemi: UTA R-4513; 2 km E Tixtla: KU 105703.

Anolis omiltemanus—**Mexico:** Guerrero: 15 mi W Asoleadero: UMMZ 130985; La Laguna near Omiltemi: IBH 26554–57, 26559; SMF 96226–30; 0.5–1.0 m S Omiltemi: UTA R-4408; 1.0 mi E Omiltemi: UTA R-4409; 2 mi W Omiltemi: MCZ R-78717; 1.5 km E Omiltemi, Chilpancingo de Los Bravo: MZFC 2825;

Omiltemi, Barranca de Potrerillos, Chilpancingo de Los Bravo: MZFC 2826–27, 2829; Omiltemi, Chilpancingo de Los Bravo: MZFC 3066–67; Omiltemi, Cueva del Borrego, Chilpancingo de Los Bravo: MZFC 2813; Plan de Potrerillos, 2 km E Omiltemi, Chilpancingo de Los Bravo: MZFC 2814–15, 2830–31, 2833; Plan de Potrerillos, 2.5 km E Omiltemi, Chilpancingo de Los Bravo: MZFC 2828, 2832; 1 km E Omiltemi, 28 km W Chilpancingo: POE 3817 (MZFC uncatalogued); 21 km W Chilpancingo, road to Omiltemi: POE 3819, 3821, 3827, 3829 (MZFC uncatalogued); 38 km W Milpillas/Casa Verde: POE 3786–87, 3789–90 (MZFC uncatalogued); 14 km E Mazatlan: MVZ 106304–06.

Anolis taylori—**Mexico:** Guerrero: Acapulco: USNM 132358–61; Acapulco, Jardin Botanico: IBH 26597, 26602–03, SMF 96268–74; Acapulco, zona arqueologica Palma Sola: IBH 26595–98, 26604; mountains near Acapulco: FMNH 116741–43, 116746–48, 116750, 116752, 116754–56, 116759, 116762–65, 116767, MCZ R-58225–26, UIMNH 20099, 200101–02, 200104, 200106; 0.5 mi S Las Cruces: KU 320889–93; 1 mi W Puerto Marqués: KU 320902–08.

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